Oct. 6, 1959 H. P. GLASS 2,907,374

RECLINING CHAIRS EMPLOYING MOVABLE BACK AND LEG RESTS

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FIG. 1.

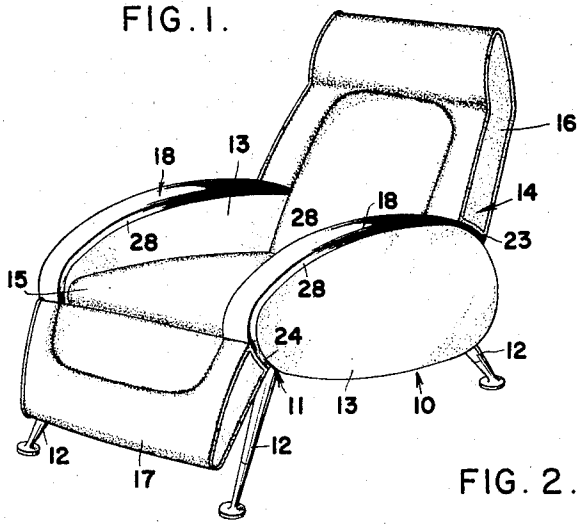


FIG. 2.

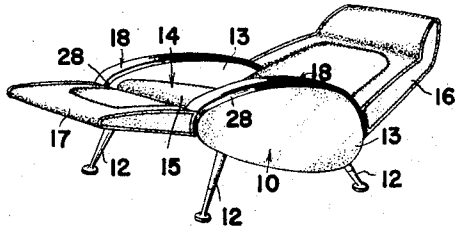


FIG. 3.

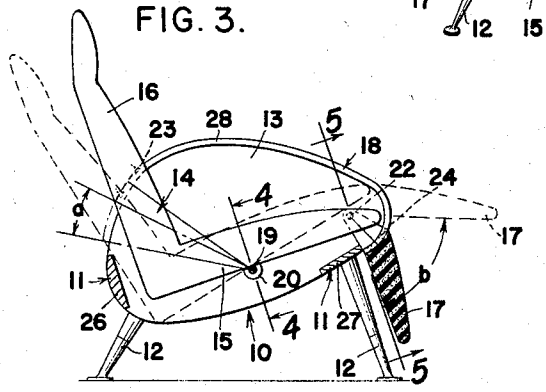


FIG. 6.

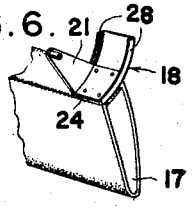


FIG. 4.

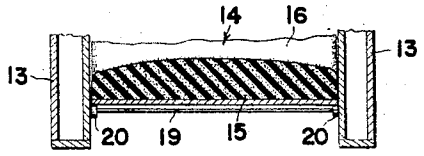
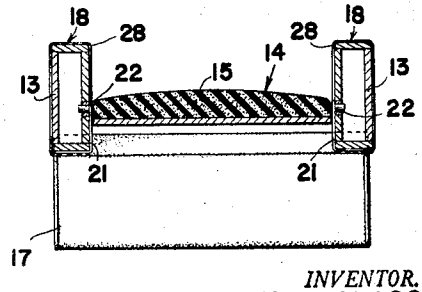


FIG. 5.



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Fig. 7.

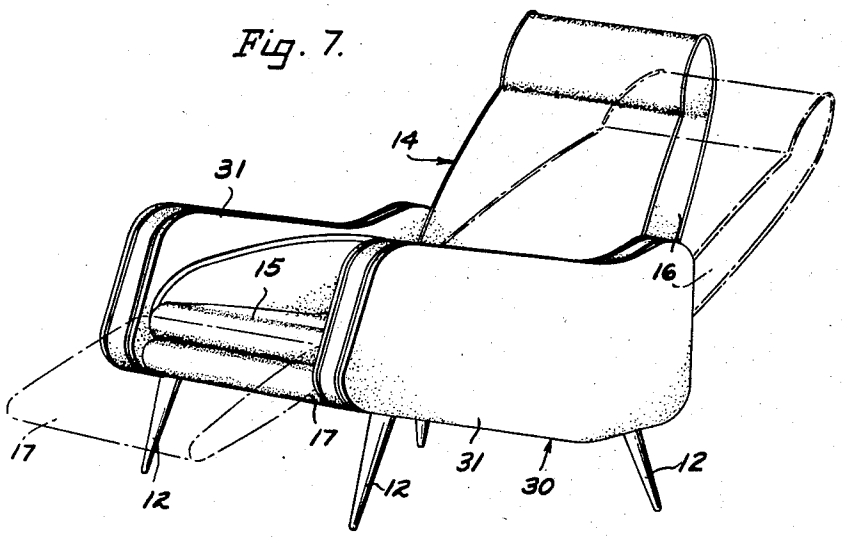


Fig. 8.

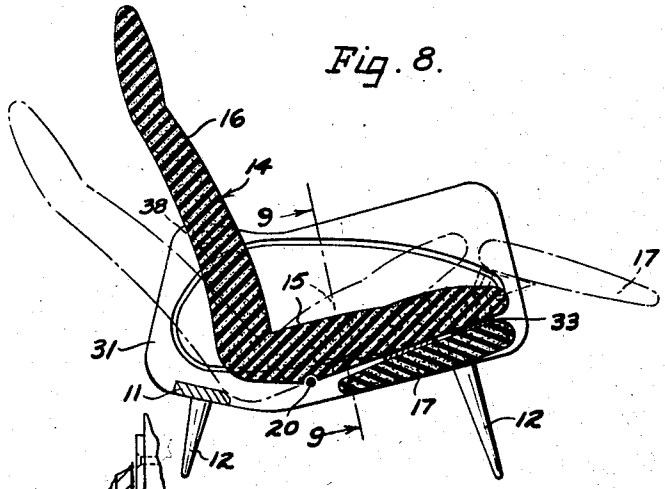
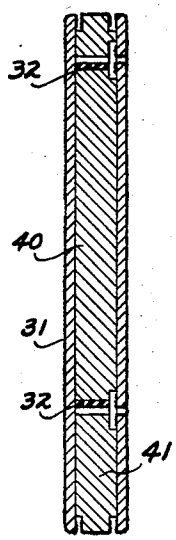


Fig. 9.



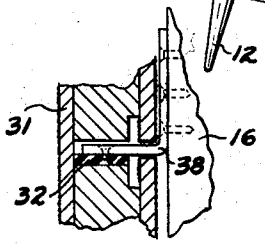
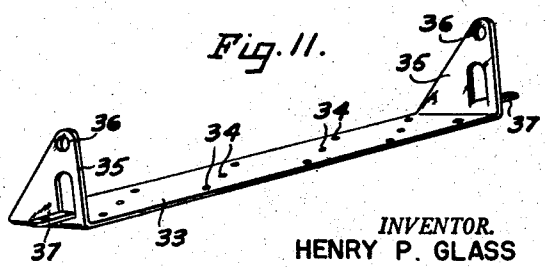


Fig. 10.

Fig. 11.



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RECLINING CHAIRS EMPLOYING MOVABLE BACK AND LEG RESTS

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Application February 26, 1958, Serial No. 717,737

9 Claims. (Cl. 155—106)

This invention relates to articles of furniture and more particularly to a new and improved reclining chair having back and leg rests which are adjustable simultaneously. This disclosure is a continuation in part of United States patent application Serial Number 661,228 filed May 23, 1957 by Henry Peter Glass and entitled Reclining Chairs Employing Movable Back and Leg Rests, now abandoned.

Reclining chairs having adjustable back and leg rests have been known heretofore, but they usually require mechanisms which were not only expensive to manufacture but usually actuate the back and leg rest structures through similar arcuate paths.

In accordance with this invention a new and improved reclining chair is provided comprising a frame having a pair of spaced arm members fixedly attached thereto, a support member having a seat portion and a back portion, and a leg rest member extending between the arm members adjacent one edge of the seat portion. The support member is pivotally mounted on the frame between the arm members, and the leg rest member is pivotally mounted on the arm members. A belt transmission means is supported by one of the arm members and is secured at one end to the leg rest member and at the other end to the back portion of the support member. The support member has a radius of rotation extending between its pivotal support mounting and the point of transmission means attachment thereto which is greater than the radius of rotation of the leg rest member extending between its pivotal mounting and its transmission means attachment, thereby causing the unattached end of the leg rest member to move through a greater arc than the arc travelled by the unattached end of the back portion.

It is therefore one object of this invention to provide a new and improved reclining chair.

Another object of this invention is to provide a new and improved reclining chair in which a movable back portion and a leg rest member move through different arcuate paths.

A further object of this invention is to provide a new and improved reclining chair in which the particular location of the pivotal connection of the seat and back portions on the frame of the chair with respect to the pivotal connection of the leg rest member on the arm members of the chair causes a variation in the angle of rotation of the seat and back portions of the chair with respect to the angle of rotation of the leg rest member.

A still further object of this invention is to provide a new and improved reclining chair in which the radius of curvature of the arm rests at various positions along their peripheries affect the angle of rotation of the back portion with respect to the angle of rotation of the leg rest member.

A still further object of this invention is to provide a new and improved reclining chair in which the position of the back portion determines the position of the leg rest member and vice-versa.

A still further object of this invention is to provide a new and improved reclining chair in which the leg rest member is movable from a position adjacent the underside surface of the seat portion to a position wherein the leg rest member extends out from the edge of the seat portion.

Objects and advantages other than those set forth will be apparent from the following description when read in connection with the accompanying drawing, in which:

Fig. 1 is a perspective view of a reclining chair with the back portion and leg rest members in their substantially vertical position and embodying the invention;

Fig. 2 is a reduced perspective view of the chair illustrated in Fig. 1 in the reclining position;

Fig. 3 is a side view partly in section of the reclining chair illustrated in Fig. 1 with the dotted lines illustrating the parts of the chair in the reclining position;

Fig. 4 is a partial cross section view of the chair illustrated in Fig. 3 taken along the line 4—4;

Fig. 5 is a partial cross section view of the chair illustrated in Fig. 3 taken along the line 5—5;

Fig. 6 is a partial perspective view of one end of the leg rest member illustrating the lever arm for pivotal connection to the arm members of the chair;

Fig. 7 is a perspective view of a modification of the reclining chair illustrated in Fig. 1 with the reclining position shown in dash-dot lines and embodying the invention;

Fig. 8 is a cross-sectional side view of the reclining chair illustrated in Fig. 7;

Fig. 9 is a partial cross sectional view of the chair illustrated in Fig. 8 taken along the line 9—9;

Fig. 10 is a partial end view of the structure shown in Fig. 8 illustrating the means for fastening the transmission belt to the support member of the chair; and

Fig. 11 is a perspective view of the pivotal mounting support means for the leg rest member illustrated in Figs. 7 and 8.

Referring more particularly to the drawing by characters of reference, Figs. 1, 2 and 3 illustrate a new and improved reclining chair **10** comprising a frame **11** including a plurality of spaced legs **12** as a part thereof and having a pair of spaced substantially parallelly arranged arm members **13** fixedly attached thereto, a support member **14** having a seat portion **15** and a back portion **16** fixedly attached to each other, a leg rest member **17** extending between the arm members **13** adjacent one edge of the seat portion **15**, and a pair of transmission means **18** one arranged for movement over at least a part of the outer periphery of each of said arm members **13**. Each transmission means **18** is suitably connected at one end to the leg rest member **17** and at the other end to the back portion **16**. The support member **14** is pivotally mounted between the arm members **13**. As shown in Figs. 3 and 4 the seat portion **15** of support member **14** is pivotally attached to arm members **13** by means of a rod **19**. Rod **19** is fixedly secured to seat portion **15** at the lower surface thereof and is rotatably mounted in suitable bearings **20** fixedly attached to arm members **13**. Leg rest member **17** is pivotally mounted at one end thereof between and on arm members **13** and adjacent seat portion **15**. Each pivotal connection of leg rest member **17**, one of which is shown in Fig. 6, comprises a lever arm **21** fixedly secured to leg rest member **17** and extending outwardly therefrom to a pivotal connection formed either within arm member **13** or on one of the juxtaposition surfaces thereof. As shown in Fig. 3 the pivotal connections of lever arms **21** to arm members **13** occur at a point **22** at or below the surface of seat portion **15** when the reclining chair **10** is in its substantially vertical position, thus hiding the moving parts of the leg rest member pivotal connecting means from sight regardless of the positions of seat portion **15** and leg rest member **17**.

The transmission means 18 shown in Figs. 1–6 of the drawings are illustrated as belts each nailed at one end to a portion of leg rest member 17 overhanging the outer periphery of arm members 13 and extending over the arm rest portions of members 13 to an arm rest overhanging part of back portion 16. The belts are each nailed to back portion 16 so that upon pivotal movement of support member 14 movement of leg rest member 17 occurs.

In accordance with the invention claimed back portion 16 of support member 14 is rotated through a predetermined arcuate path causing leg rest member 17 to move through a much greater arcuate path. In this manner the back and seat portions of support member 14 rotate through a limited arc remaining in a position inclined to the horizontal, while the leg rest member is actuated from substantially a vertical position to substantially a horizontal position.

To accomplish this amplification of the movement of support member 14, the support member is provided with a radius of rotation extending between its pivotal support mounting at bearings 20 and its transmission means attachment at point 23 which is greater than the radius of rotation of leg rest member 17 extending between its pivotal support mounting at point 22 and the attachment to leg rest member 17 at point 24. As noted from the drawings any movement of the back rest portion 16 is transmitted through the belt mechanism 18 to the leg rest member 17. Therefore, the increment of movement *a* of belt mechanism 18 at the back portion of support member 14 is equal to the increment of movement *b* at the leg rest member 17. To express this amplification of movement of back portion 16 in other language, the outer peripheries of arm members 13 are so formed that the edges of the substantially identically shaped arm rests adjacent the leg rest members 17, traveled by it and one end of the belt transmission means, have a smaller radius of curvature than the radius of curvature of the other end of the periphries of the arm members traveled by the back portion 16 and the other end of the belt transmission means 18. As noted from the drawings, the support member 14 is pivotally mounted between the arm members 13 at a predetermined level above the floor and the leg rest member 17 is mounted at a level higher above the floor than member 14.

The belt transmission means are in frictional engagement with the arm rest portions of arm members 13 and will stop firmly at any point thereon to retain the chair in any reclining position. Actuation of the support and leg rest members occur when a little extra force is applied to either the back portion or the leg rest member. Backward or counterclockwise movement of back portion 16 is limited by cross bar 26 forming a part of frame 11 which also serves as a limit for the upward movement of leg rest member 17 through transmission means 18. The upward movement of back portion 16 is limited by cross bar 27 forming a part of frame 11 which controls the downward or clockwise movement of leg rest member 17.

Although the transmission means 18 is shown as a belt moving over the crown or outer periphery of the arm members, nevertheless it is within the scope of this invention to use any other type of transmission means which passes over or through any part of the arm members from the leg rest member to the back portion of the support member. Further, it is intended to be within the scope of this invention to either conceal the belt transmission means in a suitable conduit or track as it passes over the crown of the arm members or to leave them exposed as shown in the drawings. It is also contemplated in accordance with the invention to provide the transmission means within or outside the lateral confines of the arm members and intermediate the front and rear ends thereof.

Fig 6 illustrates the belt transmission means as comprising a rubber shell having ridges 28 protruding therefrom which fit over and snugly hug the outer edges of the crown of the arm rests of members 13. As shown in Fig. 6 lever arm 21 and the shell of belt transmission 18 is fixedly attached to the arcuate formed end of leg rest member 17. Still further, this disclosure is not intended to be limited to the construction and form of the chair structure shown but may be of any plain, upholstered or ornamental style known.

Figs. 7 through 11 illustrate a modification of the reclining chair 10 illustrated in Figs. 1 through 6 wherein like parts in chair 30 are identified with similar reference characters. Chair 30 comprises a frame 11 including a plurality of spaced legs 12 as a part thereof and having a pair of spaced substantially parallelly arranged arms 31 fixedly attached thereto, a support member 14 having a seat portion 15 and a back portion 16 fixedly attached to each other, a leg rest member 17 extending between the arm members 31 adjacent one edge of the seat portion 15, and a pair of endless transmission means 32 are arranged for movement on each of the arm members 31. Each transmission means 32, which may if so desired be concealed as shown within arm members 31, is suitably connected to a leg rest support and pivotal mounting means 33 at opposite sides thereof and at another point to the back portion 16 at opposite sides thereof. The support member 14 is pivotally mounted between the arm members 31 in the same manner as shown in Fig. 3.

Leg rest member 17 is fixedly secured to mounting support means 33 by wood screws or the like through apertures 34 formed in support means 33. Means 33 usually formed of a suitable metal is provided with arms 35 one on each end thereof which arms are pivotally mounted by means of apertures 36 formed at the ends thereof to arm members 31. As shown in Fig. 11 arms 35 of support means 33 are each notched out to provide tabs 37 to which the belt transmission means 32 are secured. Thus, upon pivotal movement of support means 33 by the belt transmission means 32 which is secured to tabs 37 the leg rest member 17 is actuated from one position to another.

Fig. 9 illustrates how the inside of the arm members 31 are divided into two spaced portions 40 and 41. The outer circumference of the core portion 40 forms a track for the endless belt transmission means 32.

Fig. 10 illustrates how the belt transmission means is fastened to the back portion 16 by means of a right angle bracket 38 screwed to back portion 16 and bolted to the belt transmission means 32.

In accordance with the invention claimed and in the manner fully described above under the description of Figs. 1 through 6 back portion 16 of support member 14 is rotated through a predetermined arcuate path causing leg rest members 17 to move through a much greater arcuate path. In this manner the back and seat portions of support member 14 rotate through a limited arc remaining in a position inclined to the horizontal, while the leg rest member 17 is actuated from a position wherein it is adjacent the underside surface of the seat portion to a position wherein the leg rest member extends out from one edge of the seat portion. This amplification of movement of leg rest member 17 to back portion 16 and the movement of the parts of the chair are accomplished in the same manner as described above for reclining chair 10 in Figs. 1 through 6.

The modification illustrated in Figs. 7 through 11 shows a reclining chair wherein the leg rest member is out of sight when the chair is in an upright position but which is quickly rotated about a spaced pivot point from a concealed position to an inclined position adjacent to but spaced slightly from the edge of the seat portion of the chair upon movement of the back portion of the chair to the inclined position.

Although but two embodiments of the present invention have been illustrated and described, it will be ap-

parent to those skilled in the art that various changes and modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

I claim:

1. A reclining chair comprising a frame having a pair of spaced arm members fixedly attached thereto, a support member having a seat portion and a back portion, said support member being pivotally mounted between said arm members, a leg rest member extending between said arm members, said leg rest member being pivotally mounted in said arm members, and transmission means supported by one of said arm members, said transmission means being secured to said leg rest member and to said back portion, said support member having a radius of rotation defined by the length between its pivotal support mounting and its transmission means attachment which is greater than the radius of rotation of said leg rest member defined by the length between its pivotal mounting and its transmission means attachment.

2. A reclining chair comprising a frame having a pair of spaced arm members fixedly attached thereto, a support member having a seat portion and a back portion, said support member being pivotally mounted between said arm members, a leg rest member extending between said arm members adjacent one edge of said seat portion, said leg rest member being pivotally mounted in said arm members and movable from a position wherein said leg rest member is adjacent the underside surface of said seat portion to a position wherein said leg rest member extends out from said one edge of said seat portion, and transmission means supported within the lateral confines of at least one of said arm members, said transmission means being secured to said leg rest member and to said back portion, said support member having a radius of rotation defined by the length between its pivotal support mounting and its transmission means attachment which is greater than the radius of rotation of said leg rest member defined by the length between its pivotal mounting and its transmission means attachment.

3. A reclining chair comprising a frame having a pair of spaced arm members fixedly attached thereto, a support member having a seat portion and a back portion, said support member being pivotally mounted between said arm members, a leg rest member extending between said arm members, said leg rest member being pivotally mounted in said arm members, and belt transmission means arranged for movement longitudinally of one of said arm members, said transmission means being secured to said leg rest member and to said back portion, said support member having a radius of rotation defined by the length between its pivotal support mounting and its transmission means attachment which is greater than the radius of rotation of said leg rest member defined by the length between its pivotal mounting and its transmission means attachment.

4. A reclining chair comprising a frame having a pair of spaced arm members fixedly attached thereto, a support member having a seat portion and a back portion, said support member being pivotally mounted between said arm members, a leg rest member extending between said arm members adjacent one edge of said seat portion, said leg rest member being pivotally mounted on said arm members and movable from a position wherein said leg rest member is adjacent the underside surface of said seat portion to a position wherein said leg rest member is spaced from and extends out from said one edge of said seat portion, and an endless transmission means arranged for movement longitudinally of one of said arm members, said transmission means being secured to said leg rest member and to said back portion, said support member having a radius of rotation defined by the length between its pivotal support mounting and its transmission means attachment which is greater than the radius of rotation of said leg rest member defined by the length between its pivotal mounting and its transmission means attachment.

5. A reclining chair comprising a frame having a pair of spaced arm members fixedly attached thereto, a support member having a seat portion and a back portion fixedly attached to each other, said support member being pivotally mounted on and between said arm members, a leg rest member extending between said arm members adjacent one edge of said seat portion, said leg rest member being pivotally mounted on each of said arm members and movable from a position wherein said leg rest member is adjacent the underside surface of said seat portion to a position wherein said leg rest member extends out from said one edge of said seat portion, and an endless belt transmission means arranged for movement over at least a part of each of said arm members, said transmission means each being secured at one point to said leg rest member and at another point to said back portion, said support member having a radius of rotation extending between its pivotal support mounting and the transmission means attachment thereto which is greater than the radius of rotation of said leg rest member extending between its pivotal mountings and the transmission means attachment thereto thereby causing the unattached end of said leg rest member to move through a greater arc than the arc traveled by the unattached end of said back portion.

6. A reclining chair comprising a frame having a pair of spaced arm members, a support member having a seat portion and a back portion, said support member being pivotally mounted intermediate said arm members, a leg rest member pivotally supported in said arm members and extending therebetween, and transmission means disposed laterally of said seat portion intermediate the front and rear confines of said arm members, said transmission means being secured to said leg rest member and to said back portion, the radius of rotation of said support member between the pivotal support thereof and its attachment to said transmission means being greater than the radius of rotation of said leg rest member between the pivotal support thereof and its attachment to said transmission means.

7. A reclining chair comprising a frame having a pair of spaced arm members fixedly attached thereto, a support member having a seat portion and a back portion, said support member being pivotally mounted on and between said arm members, a leg rest member extending between said arm members adjacent one edge of said seat portion, said leg rest member being pivotally mounted on said arm members, and belt transmission means arranged for movement within the lateral confines of one of said arm members, said transmission means being secured at one end to said leg rest member and at the other end to said back portion, said support member having a radius of rotation defined by the length between its pivotal support mounting and the transmission means attachment thereto which is greater than the radius of rotation of said leg rest member defined by the length between its pivotal mounting and the transmission means attachment thereto.

8. A reclining chair comprising a frame having a pair of spaced substantially parallelly arranged arm members fixedly attached thereto, said arm members having substantially identically shaped outer peripheries, a support member having a seat portion and a back portion fixedly attached to each other, said support member being pivotally mounted on and between said arm members at a predetermined level above the floor, a leg rest member extending between said arm members adjacent one edge of said seat portion, said leg rest member being pivotally mounted on each of said arm members at a level higher above the floor than said predetermined level, and a pair of belt transmission means each arranged for movement over at least a part of the outer periphery of a different one of said arm members, said transmission means being

secured at one end to said leg rest member and at the other end to said back portion and each being in frictional engagement with said outer periphery of one of said arm members, said support member having a radius of rotation defined by the length between its pivotal support mounting and its transmission means attachment which is greater than the radius of rotation of said leg rest member defined by the length between its pivotal mounting and its transmission means attachment, thereby causing said leg rest member to move through a greater arc than said back portion.

9. A reclining chair comprising a frame having a pair of spaced arm members fixedly attached thereto, a support member having a seat portion and a back portion, said support member being pivotally mounted between said arm members, a leg rest member extending between said arm members adjacent one edge of said seat portion, said leg rest member being pivotally mounted on said

arm members, and an endless transmission means arranged for movement longitudinally of one of said arm members, said transmission means being secured to said leg rest member and to said back portion, said support member having a radius of rotation extending between its pivotal support mounting and its transmission means attachment which is greater than the radius of rotation of said leg rest member extending between its pivotal mounting and its transmission means attachment.

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